

## MOSAIC STTR

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### Description:

The **MOSAIC** (**M**icro-scale **O**ptimized **S**olar-cell **A**rrays with **I**ntegrated **C**oncentration) Program will fund potentially disruptive technologies and related system concepts to achieve new performance and cost benchmarks for solar-electric generation from photovoltaics (PV). Specifically, **MOSAIC** will develop novel concepts that integrate arrays of high-performance micro-scale concentrated PV (micro-CPV) elements into modules that are similar in profile and cost to traditional non-concentrated “flat-plate” (FP) PV, but achieve the performance level associated with conventional Concentrated Photovoltaics (CPV). Realization of the aggressive targets of **MOSAIC** will require the formation of R&D teams from several communities, including material scientists, electrical and packaging engineers, optical engineers, micro-scale manufacturing specialists, and researchers in polymers and opto-electronics.

The **MOSAIC** Program’s overall technical target is solar-to-electrical power conversion efficiency (as measured against total annual incident solar radiation) of > 30% across a wide range of geographic locations with varying amounts of direct and diffuse insolation. This would represent an approximately 50% improvement over conventional “1-sun” FP PV module performance. Such an advance will significantly reduce the area and number of modules needed to provide a given power output – and thereby reduce those Balance of System (BOS) costs associated with installation and maintenance that are proportional to installed system area. If micro-CPV-based panels achieve production costs comparable to those of 1-sun conventional panels (now roughly \$100/m<sup>2</sup>), then the benefit from reduced BOS costs will lead to system costs as low as \$0.75/W and \$1.25/W for utility and residential market applications, respectively, resulting in a decrease in the PV-generated Levelized Cost of Energy (LCOE) across a wide geographic domain. Further, the significant reduction in the footprint needed for a given power output may also expand the adoption of PV solar in the constrained-space rooftop market, where many roofs are currently too small, too shaded, or sub-optimally oriented for installation of today’s PV panel technology to be economical.